

COUNTRY Hungary/USSR

DATE DISTR. 9 MAY 50

50X1

SUBJECT Adjustment of Freight Cars to Broad Gauge

NO. OF PAGES 2

PLACE ACQUIRED

NO. OF ENCLS. (LISTED BELOW) 50X1-HUM

DATE OF INFO.

SUPPLEMENT REPORT NO.

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Alteration of Two-Axle Cars

1. Since the new axle must move on a broad-gauge line, the distance between the wheels must be increased. Generally the wheels are pressed onto the axle, which means that the axle must be heated. As a result, the bore in the wheel's center heats up, and enlarges, so that the wheel can be easily mounted on the fit. The wheel is then allowed to cool and the bore contracts, confining the axle so tightly that it cannot be dislodged without reheating. No wheel can be mounted twice on the same fit. Since Russian railroads can take European wheels, only the axles are exchanged and the old wheels mounted on the new axles. This was done in the case of five thousand cars of German goods which the Hungarian railroads changed over to broad gauge. The broad-gauge axles were furnished by the Russians and all the rest of the work was done in the workshops of Zahony. The old oil boxes can be used on the broad-gauge axles.
2. For broad gauge the axle-guard must be located farther away from the central line of the vehicle than for standard gauge. The guard is made either of cast iron or of laminated sheets of metal. Eastern European cars are constructed in such a fashion that if the axle-guards are attached to the inner side of the shaft of the chassis, the guard is in just the place prescribed by railroad standards. In the case of a change-over the axle-guard must be bent in order that it may be placed in its new position. The original riveting must therefore be cut, the guard dismounted, reheated and re-riveted to the chassis shaft.
3. The load of the cars is transmitted by the springs to the axles, which has the advantage that the chassis receives an exactly vertical load. Generally the chassis shaft has an "I"-shaped profile on freight cars.
4. Because of the new broad gauge, the suspension of the springs must also take a more exterior position and may not rest exactly underneath the chassis shaft. For this reason, on the outer side of the chassis shaft another special shaft is riveted to hold the suspension supports. The chassis shaft of cars altered to broad gauge thus receives, besides the vertical load, a torsion load, but this is not so powerful as to have a serious effect upon the life of the cars.
5. Altering the brakes is the simplest operation. The brake shoes must merely occupy a more outside position and are able to exercise their braking

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Auth: 1 MR 70-158
Date: 5 JUN 1978

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effect on the surface of the wheels. Since the brake gears are in the center of the vehicle, they remain unchanged. The main suspension rod of the brake shoes must be bent as much as is necessary, and the brake triangles must be exchanged in order to regulate the distance between the brake shoes. The brake triangles can be altered with little effort.

Alteration of Four-Axle Cars

6. The four-axle car has two bogies, in each of which are mounted two axles. It is most important that the bogies be kept independent of the chassis. Alteration of gauge for the four-axle car is accomplished simply by exchanging the regular ones for broad-gauge bogies. The chassis (with the caisson of the vehicle) is elevated, the old bogie is pulled out and replaced with a new one. The operation is carried out at both ends of the car, and only a few screws must be tightened. Changing over these two bogies does not take more than one hour. This type of alteration has the advantage that the cars can always be changed back to normal gauge while the two-axle car can be changed over only by the entire complicated process described above.
7. In the case of the four-axle cars, the entire brake gear is located on the bogies and is manipulated by a shaft connected to a brake roller located on the car's chassis.
8. Although the transformation of four-axle cars is simple, both standard and broad-gauge bogies must be on hand (in supply). In the event that the bogies must be altered, all the work involved in altering the two-axle car must be performed, which in the case of the four-axle car is doubled. The construction of the bogies is such and the alteration of them so complicated that in practice it is not feasible to alter them and is much better to build new ones.
9. There is yet a greater difficulty. In the satellite countries there are so few freight cars with four axles that it is impossible to undertake very extensive shipments.

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